2007

Promoting responsible environmental behavior in second grade students

Mary Annette Kirchhoff

PROMOTING RESPONSIBLE ENVIRONMENTAL BEHAVIOR IN SECOND GRADE STUDENTS

A Project

Presented to the

Faculty of

California State University,

San Bernardino

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

in

Education:

Environmental Education

---

by

Mary Annette Kirchhoff

June 2007

PROMOTING RESPONSIBLE ENVIRONMENTAL BEHAVIOR IN SECOND GRADE STUDENTS

A Project

Presented to the

Faculty of

California State University,

San Bernardino

---

by

Mary Annette Kirchhoff

June 2007

Approved by:

[redacted]

Dr. Darleen Stoner, First Reader — May 7, 2007 Date

[redacted]

Dr. Gary Negin, Second Reader

ABSTRACT

This project incorporates environmental education lessons and resources into the language arts and math curriculum for second grade teachers. Outdoor activities and children's literature that correspond to each language arts lesson and each chapter of the math curriculum are identified. It is the intent of this project to make incorporating environmental education into the mandated classroom curriculum easily accessible to second grade teachers at The Ontario Center School, and to be a model for use by other second grade teachers. The resources included meet these four environmental education goals: environmental awareness and ethics, environmental knowledge, citizen action skills, and citizen action experience. These goals were selected through the research reviewed on the goals of environmental education and how responsible environmental behavior can be developed in children. This project will enable students to develop the knowledge, attitudes, and skills they need to become environmentally responsible citizens.

ACKNOWLEDGMENTS

I would like to thank Dr. Stoner for all her help and encouragement through out this program.

TABLE OF CONTENTS

CHAPTER ONE

INTRODUCTION

A few years ago I started a recycling program at the elementary school where I teach. I believed it would be a good fundraiser and also a way to get the students involved in helping the environment. I thought this would be a simple project because I assumed that everyone recycles. I soon realized that not everyone shares my passion for the environment or participates in recycling. It quickly became apparent to me that the students and teachers needed to gain a greater awareness and sensitivity toward environmental issues. This experience prompted me to investigate what leads people to engage in environmentally responsible behavior.

Many studies have been conducted to determine what motivates people to be environmentally responsible citizens. Most researchers agree that knowledge of the environment, environmental sensitivity, and the knowledge of and the ability to use action skills are the primary predictors of responsible environmental behavior (Hungerford & Volk, 2001a).

As an environmental educator I know that by incorporating environmental education into our school's

curriculum I can help insure that the students will develop responsible environmental behavior. The goal of environmental education is to assist students in acquiring environmental sensitivity, knowledge, and the skills required to protect and sustain the environment. Engleson and Yockers identified five similar goals which clearly define what students need to achieve. They are environment awareness, knowledge, environment ethic, citizen action skills, and citizen action experience (1994). This project incorporates these goals for environmental education into the second grade language arts and math curriculum used at The Ontario Center School.

While doing research on children's relationship with nature, author Richard Louv interviewed a fourth grader who stated, "I like to play indoors better 'cause that's where all the electric outlets are" (2005, p. 10). As more and more children spend less time in nature, what does our future hold? As environmental educators it is our responsibility to reconnect students with nature.

The goal of this project is for second grade students at The Ontario Center School to gain a greater knowledge about the environment and more motivation to protect it. This will be accomplished by providing outdoor lesson plans and activities that correspond to each language arts

lesson and math chapter. These activities will be available for the seven-second grade teachers to use with their students on a weekly basis.

Children's literature is an important component of the language arts curriculum. "Using children's literature is one of the best ways to incorporate environmental education into the classroom" (O'Brien & Stoner, 1987, p. 15). Children's books can sometimes provide a more clear explanation of environmental concepts than textbooks. One researcher noted that using children's literature to discuss environmental issues led to an increase in the student's environmental vocabulary and critical thinking skills (Christenson, 2004). This project will also include a list of children's books that will promote environmental sensitivity and reinforce the environmental concepts of each outdoor activity.

In this time of academic stressed curriculum, teachers need convenient ways to incorporate environmental education into their day. This project will provide teachers with easy access to such resources which will, in turn, enable students to develop the knowledge, attitudes, and skills they need to become environmentally responsible citizens.

CHAPTER TWO

REVIEW OF THE LITERATURE

Introduction

The world today is faced with many crucial environmental issues, such as global warming, water quality and quantity, and waste management, to name a few. In order to tackle these issues, people must acquire the skills for responsible environmental behavior. Research has shown that environmental sensitivity developed through direct experiences with nature, knowledge of the environment, and knowledge of (and experience with) action skills to be the most influential variables in promoting responsible environmental behavior (Hungerford & Volk, 2001a; Marcinkowski, 2001).

Environmental sensitivity is being aware of the environment through an empathetic perspective. One of the main influences of environmental sensitivity is spending time outdoors, especially in childhood (Sward & Marcinkowski, 2001). According to Louv, "Today's society is teaching young people to avoid direct experiences with nature" (2005, p. 2). Louv gave the example of summer camps in the past as places used to hike in the woods and learn about plants and animals. Today summer camps are

geared more toward weight loss or computer skills (Louv, 2005). For today's children nature is more of an abstract concept than reality they come in contact with. Louv provided the example of a recent television commercial which shows a four-wheel-drive vehicle driving along a beautiful mountain stream while two children in the back seat watched a movie on a flip down video screen. Thus, Louv concluded that as children have become less connected with the natural world, environmental education needs to become a more vital part of the curriculum (2005).

This chapter begins with defining environmental education and its goals. The ultimate goal of environmental education is to lead to the development responsible environmental behavior. Therefore, this chapter also defines responsible environmental behavior and reviews research done on how to help children develop it. Next, environmental sensitivity, which is one of the main predictors of responsible environmental behavior, is discussed. Finally, children's literature is reviewed because of the impact it can have on developing environmental sensitivity as well as critical thinking skills.

Environmental Education and its Goals

Environmental education has been defined as education "aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, are aware of how to help solve those problems, and are motivated to work toward their solutions" (Stapp et al., 1969, p. 31). This definition was developed in a graduate seminar in the University of Michigan's Department of Resource Planning and Conservation. In four major objectives, Stapp et al. described environmental education as helping individuals to acquire:

1. A clear understanding that man is an inseparable part of a system, consisting of man, culture, and the biophysical environment.
2. A broad understanding of the biophysical environment, both natural and man-made, and its role in contemporary society.
3. A fundamental understanding of the biophysical environmental problems confronting man, and how these problems can be solved, and the responsibility of citizens and government to work toward their solution.
4. Attitudes of concern for the quality of the biophysical environment which will motivate

> citizens to participate in biophysical environmental problem solving. (Stapp et al., 1969, p. 31)

The Tbilisi Declaration is considered an important contribution to defining environmental education. The Tbilisi Declaration was developed from a series of international conferences and workshops sponsored by the United Nations Educational, Scientific, and Cultural Organization and the United Nations Environmental Programme held in Tbilisi in the former Soviet Union. The Tbilisi Declaration included the goal for environmental education as

> to help students become environmentally aware, knowledgeable, skilled, dedicated citizens who are committed to work, individually and collectively, to defend, improve, and sustain the quality of the environment on behalf of present and future generations of all living things. (Engleson & Yonkers, 1994, p. 14)

The Tbilisi Declaration included five subgoals for students related to environmental education, which provide insight to effective curriculum programs. These subgoals are perceptual awareness, knowledge, environmental ethic,

citizen action skills, and citizen action experience (Engleson & Yockers, 1994).

Perceptual Awareness

Perceptual awareness is the student's ability to "perceive and discriminate among stimuli; to process, refine and extend those perceptions; and to concurrently acquire an aesthetic sensitivity to both natural and the built environment" (Engleson & Yockers, 1994, p. 14). Sensory-oriented experiences begin with the receipt of stimulus which is then followed by an emotional response. This in turn leads to contemplation over the source of the stimuli. As the senses act together, attitudes and values are formulated. Aesthetic sensitivity and awareness are important building blocks to environmentally responsible behavior. "Involving students in sensory experiences provides input into attitudinal changes that bring about behavior leading to environmental renewal and preservation" (Engleson & Yockers, 1994, p. 19). Studies have shown that environmental sensitivity is one of the main predictors of responsible environmental behavior and that direct experiences with nature, especially in childhood, to be one of the main influences of environmental sensitivity (Chawla, 1999; Sward & Marcinkowski, 2001).

Knowledge

Knowledge is acquiring "basic understanding of how the natural environment functions, how its functioning is affected by human activity, and how harmony between human activity and the natural environment may be achieved" (Engleson & Yockers, 1994, p. 14). According to Hungerford and Volk, environmental knowledge is a prerequisite to action (2001a). A knowledge base about how the natural environment functions is essential when making decisions regarding how to interact with the environment and how to prevent and resolve issues resulting from such interactions (Engleson & Yockers, 1994).

Environmental Ethic

Environmental ethic is the development of "a universal ethic on which students may act to defend, improve, and sustain the quality of the environment" (Engleson & Yockers, 2001, p. 14). Research has shown that primary students have not yet developed higher powers of cognitive and moral reasoning (Engleson & Yockers, 2001). When working with these young students, it is important to focus on developing their environmental moral base. This can be achieved by teaching that people are part of ecosystems and therefore have a direct relationship with ecosystems.

Citizen Action Skills

Citizen action skills are the skills students need to "identify, investigate, and take action toward the prevention and resolution of environmental issues" (Engleson & Yockers, 2001, p. 14). Knowledge of an environmental issue is simply not enough. According to Hungerford and Volk, knowledge of effective action strategies is just as important a component to environmentally responsible behavior as knowledge of an issue (2001b). At the primary level, students should be taught basic literacy, how to research a topic, and problem solving skills. These will form a solid base for developing more specific action skills in the upper grades (Engleson & Yockers, 2001).

Citizen Action Experience

The final subgoal is citizen action experience. Students need to "gain experience in applying acquired perceptual awareness, knowledge, an environmental ethic, and citizen action skills in working toward the prevention and resolution of environmental issues" (Engleson & Yockers, 2001, p. 14). Students need an opportunity to put their acquired action skills to use. It is important for students to participate with community-based issues in which they can be successful (Hungerford & Volk, 2001b).

"Students must be provided instruction and experiences in the identification, investigation, and resolution of environmental issues in their own community" (Engleson & Yockers, 1994, p. 47).

Responsible Environmental Behavior

The goals of environmental education lead to developing responsible environmental behavior. Marcinkowski defined this as "observable behavior aimed at or intended to contribute to the solution of environmental problems" (2001, p. 248).

It is incorrect to assume that if students acquire knowledge regarding an issue, they will be motivated to act responsibly toward that issue (Hungerford & Volk, 2001a). Knowledge of the environment and related issues is among the top predictors of responsible environmental behavior, but more is needed than just knowledge. Researchers differ slightly in the ranking, but agree on these top three variables: knowledge of the environment and its related issues, knowledge of and experience with action skills, and environmental sensitivity (Hungerford & Volk, 2001a; Marcinkowski, 2001). Thus, students need basic background knowledge on the environment to be able to identify issues. Once students have identified an

environmental issue, they need the problem solving skills to successfully resolve it (Engleson & Yonkers, 1994). Knowledge of the environment and action skills has been discussed earlier in this chapter, leaving the third variable, environmental sensitivity.

Environmental Sensitivity

Environmental sensitivity has been defined as "a set of affective characteristics that result in an individual viewing the environment from an empathetic perspective" (Sward & Marcinkowski, 2001, p. 279). Researchers have indicated environmental sensitivity as an important part of environmental education and a predictor of responsible environmental behavior (Sward & Marcinkowski, 2001). The main variables found in research that have the most influence on the development of environmental sensitivity are: spending extended time in the outdoors in natural areas, often in childhood; having an adult role model who provides experiences in outdoor activities; involvement in environmental organizations; experiencing the loss or degradation of a favorite valued natural place; and environmental education and books (Chawla, 1999).

The first variable was extended time spent outdoors in natural areas. Direct experiences with nature can vary.

The activities researchers have identified include: exploring and playing outdoors, hunting, fishing, camping, and involvement in outdoor oriented youth organizations. These activities could be done alone or in groups, although some research has shown activities done with a role model to be more influential (Chawla, 1999). In almost all cases studied, formative outdoor places mentioned were childhood based. Also they were usually part of everyday life, for example, gardens, nearby lakes or forests where people played as children, summer cabins or a grandparents' farm. They were the kind of places people became comfortable with being out in the natural world (Chawla, 1999).

The next variable was adult role models. Research has suggested that role models were just as important as outdoor experiences in developing environmental sensitivity, with teachers being named most often as the role models (Sward & Marcinkowski, 2001). According to one environmentalist from Kentucky, "positive outdoor experiences need to be combined with a positive role model" (Chawla, 1999, p. 20).

Another source of environmental sensitivity was participation in environmental or outdoor organizations. This variable was important in adulthood as well as

childhood. The Boy Scouts and Girl Scouts of America were organizations mentioned in childhood influences. National organizations and groups that focused on local and statewide environmental issues were named as adult influences (Chawla, 1999).

The loss or degradation of a valued natural place was the next variable. These negative experiences took two forms: destruction of a valued place and the fear of toxic threats such as pollution or radiation. One of the main problems noted was the urbanization of natural spaces. Many people were directly affected when forests where they had skied and camped were cut down or fields where they had hiked were built up (Chawla, 1999).

The final variables noted were inspiring teachers, classes, and books. The most significant school memories mentioned were those that gave the opportunities to take action. Teachers that involved their students in field work or local environmental issues were very influential. Books which could inspire new understanding of the environment and assist in decisions making were also mentioned (Chawla, 1999). "Well-chosen works of literature are one way to immerse children in the universe, giving then a sense of place, of mystery, wonder, divine

presence, relationship, identity, and possibility for transformation" (Trousdale, 2005, p. 44).

Children's Literature

Children's literature can be one of the best tools for incorporating environmental education into the classroom. "Children tend to respond better to literature than to expository text, and consequently they are more apt to read stories than textbooks" (O'Brien & Stoner, 1987, p. 15). Children's literature can be used to help students acquire knowledge of nature. Children's literature can offer clear explanations of environmental concepts. It can also illustrate effective action skills and develop environmental sensitivity (O'Brien & Stoner, 1987; Wagner-Lawlor, 1996).

Many children enjoy reading and listening to a good story. Children's books can make concepts easier to understand than textbooks. "Books often help children understand and appreciate the environment by portraying cause-effect relationships, presenting vivid descriptions and accurate pictures, and providing vicarious experiences" (O'Brien & Stoner, 1987, p. 15).

Children's literature can help children understand the relationship between nature and society. Through

stories Nature itself can speak directly to the reader encouraging them to stand and defend it (Wagner-Lawlor, 1996). The readers sense a responsibility toward their own environment. Children can come to realize that "they can speak for Nature, and speak out against its abuse" (Wagner-Lawlor, 1996, p. 150).

Picture books are a major part of the primary classroom. "The sheer profusion and diversity of picture books and the complex ways in which children interact with the dialogue between words and images they contain has some, and possibly profound, impact on them" (Marriott, 2002, p. 177). There are a variety of types of picture books available that will contribute to a realistic appreciation of the natural world. There are expository texts, whose sole purpose is to provide information. Folk tales and stories from around the world can provide a sense that many cultures share the same thoughts and concerns for the environment. Many books share the theme of conservation, while others focus on real environmental issues (Marriot, 2002).

A study which was done on using children's literature to discuss different perspectives on diverse viewpoints in environmental issues revealed an increase in the student's environmental vocabulary and critical thinking skills

(Christenson, 2004). The teachers in the study observed that as a result of using children's literature to discuss environmental issues there was an increase in the children's ability to use environmental vocabulary correctly in their writing and discussions. One kindergarten teacher also noted that the use of environmental literature helped her incorporate some of the reading benchmarks into her lessons (Christenson 2004).

Summary

Hungerford and Volk defined the goal for curriculum development in environment education as "to aid citizens in becoming environmentally knowledgeable and, above all, skilled and dedicated citizens who are willing to work, individually and collectively, toward achieving and/or maintaining a dynamic equilibrium between quality of life and quality of the environment" (2001b, p. 101). The research reviewed in this chapter reveals that developing responsible environmental behavior requires direct experiences with nature, knowledge of the environment, and knowledge of and experience with action skills (Hungerford & Volk, 2001a; Marcinkowski, 2001). This project provides resources that second grade teachers can use to

incorporate activities and children's literature into the curriculum to enable students to develop environmental sensitivity and promote responsible environmental behavior.

CHAPTER THREE

DESIGN OF PROJECT

Introduction

This project provides resources that second grade teachers can use to incorporate environmental education into the language arts and math curriculum of The Ontario Center School. The school uses the Open Court (2002) language arts and Scott Foresman California Mathematics (Bennet et al., 2001) curricula. Both of these programs are closely correlated with the California State Standards. Environmental education lessons, activities, and children's literature which align with these curricula were organized (see Appendices A & B) to be easily available to the second grade teachers. The materials meet these four environmental education goals: environmental awareness and ethics, environmental knowledge, citizen action skills, and citizen action experience. These goals were selected through the research reviewed on the goals of environmental education and how responsible environmental behavior can be developed in children.

Environmental Awareness and Ethics Goal

In addressing this goal the students develop an awareness and sensitivity to the environment. Research

shows that one of the main influences of environmental sensitivity is outdoor experiences, especially in childhood (Chawla, 1999). The students should participate in an outdoor activity at least once a week. The park next to the school provides an excellent place to conduct outdoor lessons. Outdoor lessons and activities which correlate to the Open Court language arts curriculum (see Appendix A) and the Scott Foresman California Mathematics curriculum (see Appendix B) are included. The language arts program is divided into weekly lessons. For each lesson an outdoor activity is suggested. The math program is divided into concept chapters and a variety of outdoor activities for each chapter is provided.

Children's literature can be used to supplement the outdoor lessons. Books and stories can help students understand and appreciate the environment to a greater extent by portraying cause and effect relationships, presenting vivid descriptions, and providing vicarious experiences (O'Brien & Stoner, 1987). Students can experience nature through the literature. An appropriate environmental children's book which corresponds to the language arts curriculum is provided (see Appendix A).

Environmental Knowledge Goal

This goal enables students to gain a basic understanding of the environment and the inter-relationships that exist within it. The science curriculum used at The Ontario Center School provides a comprehensive knowledge base of the environment and our relationship with it. The lessons, activities, and children's literature that are provided in Appendices A and B will reinforce the science curriculum.

Citizen Action Skills Goal

This goal is aimed at the students acquiring the skills for identifying and solving environmental problems. Students need to be taught how to identify environmental issues and risks, along with the skills needed to find solutions to the issues. At the second grade level students should be taught basic literacy, how to research a topic, and problem solving skills (Engleson & Yockers, 2001). These skills are all covered in the language arts and math curriculum and will be reinforced through the environmentally based lessons, activities, and children's literature provided in this project.

Citizen Action Experience Goal

The students will have the opportunity to be actively involved in working toward resolution of environmental problems. It is important that the students be successful in resolving issues and that they can see some positive impact from their involvement (Hungerford & Volk, 2001b). Appendix C outlines the recycling program that is intended to be implemented in the future and includes activities and lessons regarding recycling.

The activities and lessons provided in this project have come from a variety of resource books. They were chosen with respect to their foundation in environmental education.

Copies of the lessons and activities will be kept in an organizer in the second grade closet, which is easily accessible to all teachers. Also, a monthly reminder which includes a list of each activity, its objectives and skills, and a corresponding children's book will be emailed to all second grade teachers. It is the intent of this project to make incorporating environmental education into the mandated classroom curriculum easily accessible to all second grade teachers at The Ontario Center School.

CHAPTER FOUR

IMPLICATION FOR EDUCATORS

As we look at the environmental issues we are facing today, the importance of developing responsible environmental behavior in our students is clear. Researchers agree the three main predictors of responsible environmental behavior are knowledge of the environment, environmental sensitivity, and the knowledge of and ability to use action skills (Hungerford & Volk, 2001a). By incorporating these concepts and skills into the curriculum we can help insure that students will develop responsible environmental behavior.

Teachers are already overwhelmed with the learning standards they have to cover. Adding environmental education to the curriculum needs to be as easy and stress free as possible. This project provides a convenient way to incorporate environmental education into the already existing curriculum. Many of the environmental lessons and activities provided in this project cover language arts and math standards as well as providing students with the environmental knowledge, sensitivity, and skills they need. The outdoor activities in this project are designed to develop environmental sensitivity while reinforcing

basic second grade language arts and math standards. The foundations for citizen action skills are basic literacy, research, information gathering, and problem solving skills. These are all taught in our language arts and math programs. Through the resources provided in this project, second grade teachers will be able to assist their students in developing responsible environmental behavior, while mastering the required academic standards.

Students who take what they learn in the classroom out into their local environmental and apply it improve their language arts and math skills (Lieberman & Hoody, 1998). "Instead of thinking that math is only abstract concepts, these students learn that math skills are tools that can be used to quantify, analyze, and recognize connections among natural and socio-economic systems" (Lieberman & Hoody, 1998, p. 38). As students become involved in first-hand study of their natural and human made environments, they become more enthusiastic about developing language art skills. When students read, write, and speak about topics they are interested in, they make a greater effort to strengthen these skills. One teacher who participated in the study by Lieberman and Hoody using environmental education as the curriculum base noted, "My kids seem much more eager to write...A lot of that has to do

with the children's natural curiosity and the fact that the environmental is basically the world around them" (1998, p. 34).

APPENDIX A

LANGUAGE ARTS

Language Arts

The Open Court language arts curriculum is divided into five thematic units. Each unit is divided into weekly lessons accompanied by a story, lessons in phonics, fluency, comprehension skills, word analysis, writing process strategies, and English language conventions. Each lesson is designed to be completed in one week. The program begins with a review of first grade concepts covering the first two weeks of school in a chapter called Getting Started.

An outdoor activity has been selected to accompany each weekly lesson. The outdoor activity correlates with one or more of the concepts being taught that week. Two activities are included for the Getting Started chapter. The name of the outdoor activity, the resource it can be found in, and the page number it is on is listed. Copies of each outdoor activity will be provided for the teachers.

Along with the outdoor activities, children's literature appropriate to accompany each lesson is provided. A copy of each children's book will be available for the teachers to use in their classrooms.

Getting Started

Week One

"Earth Manners" activity #87, pages 331 – 334
Project Learning Tree Environmental Education Pre K-8 Activity Guide

Objective: Students will express appropriate ways to treat living things and act to in forest, parks, and other natural areas.

Skills: Discussing, forming principles

Book: The Family of Earth by Schim Schimmel
This book shows many different animals and their environments. It draws the conclusion the earth may not look the same to different creatures, but we all share the same earth.

Week Two

"Alphabet Hike" pages 34-36
Discovering the Naturalist Intelligence

Objective: Students will collect data based on visual observations made in the outside environment and integrate data into language arts.

Skills: Data collection, observation

Book: Animalia by Graeme Base
This alphabet book combines an alliterative phrase for an animal representing each letter. Countless objects are included in each alphabet letter picture.

Book: The Living Rainforest An Animal Alphabet by Paul Kratter
There is a description of an animal from the rain forest for each letter of the alphabet.

Book: Alaska ABC Book by Charlene Kreeger and Shannon Cartwright
ABC book of animals and features from Alaska.

Unit One
Sharing Stories

Lesson 1

"Adopt A Tree" activity 21, pages 65-69
Project Learning Tree Environmental Education Pre K-8 Activity Guide

Objective: Students will describe a chosen tree using personal observation and investigation, and organize information about the tree, identify relationships between their tree and other organisms, and put together a book or portfolio about their tree.

Skills: Observing, concept forming, reasoning, organizing information

Book: The Giving Tree by Shel Silverstein
A tree and a boy have a relationship throughout the boy's life.

Book: The Tremendous Tree Book by Barbara Brenner and May Garelick
This is a book of poems about trees.

Lesson 2

"School Ground Caretakers" pages 35-41
Project Food, Land, and People

Objectives: Student will give examples of both general and closeup observations of the surrounding school ground; collect objects for further study without disturbing nature; group found objects into various categories; choose a personal place on the school grounds for observing and reflecting; evaluate the school ground as an outdoor classroom and his or her role as its caretaker; and interview the school groundskeeping staff to build respect for what school grounds need and learn how students can help become caretakers.

Skills: Classifying, comparing and contrasting, inferring, interviewing

Book: The Great Trash Bash by Loreen Leedy
Something was wrong in Beaston and Mayor Hippo finally figures out the town has too much trash. The animals of the town figure out how to deal with their trash problem.

Book: How Spider Stopped the Litterbugs by Robert Kraus
Spider and his friends turn the litterbugs into jitterbugs.

Lesson 3

"Signs of Fall" pages 299-301
Project Learning Tree Environmental Education K-8 Activity Guide

Objectives: Students will describe some of the differences between deciduous and evergreen trees, identify patterns in the changing seasons. They will understand why leaves of deciduous trees change color in the fall.

Skills: Observing, identifying relationships and patterns, comparing and contracting, and inferring

Book: Fletcher and the Falling Leaves by Julia Rawlinson
A fox begins to worry about his favorite tree as it begins to lose its leaves as fall begins.

Book: Look What I Did With a Leaf! By Morteza E. Sohi
This book has information about leaves and crafts you can make with leaves.

Book: I Am a Leaf by Jean Marzollo
A simple introduction to the life cycle and function of a leaf.

Lesson 4

"Bursting Buds" pages 232-233
Project Learning Tree Environmental Education Pre K-8 Activity Guide

Objectives: Students will explain the purpose of a tree's buds and their relationship to the leaves and describe the stages that buds go through as the leaves develop throughout the year.

Skills: Observing, ordering and arranging, identifying attributes and components, concluding

Book: Be a Friend to a Tree by Patricia Lauber
Simple but informative book about trees.

Book: Tell Me, Tree All About Trees for Kids by Gail Gibbons
This book has detailed illustrations providing basic information about trees and their functions.

Lesson 5

"Meet a Tree" pages 129-134
Hands-On Nature

Objectives: Students will review the parts of a tree and experience how a tree changes with nature to examine and record observations about a particular tree. They will describe a tree from different perspectives

Skills: Observing, identifying attributes and components, inferring

Book: The Tree in the Ancient Forest by Carol Reed-Jones
This book is written in the same style as The House that Jack Built and is about the interdependence of plants and animals in an old growth forest.

Book: The Life Cycle of a Tree by Bobbie Kalman
Text and photographs provide basic information about trees and their functions.

Unit 2
Kindness

Lesson 1

"And the Wolf Wore Shoes" pages 180-181
Project WILD

Objectives: Students will distinguish between real and imaginary animals, and give examples of real and imaginary animals and their characteristics.

Skills: Comparing and contrasting, drawing conclusions

Book: Charlie the Caterpillar by Dom DeLuise
A story about the life cycle of a butterfly with a twist about friendship.

Book: Frog and Toad All Year by Arnold Lobel
Friends Frog and Toad have many adventures.

Book: The Usborne World of Animals by Susanna Davidson and Mike Unwin
Great pictures and facts about a wide variety of animals.

Book: Birds A First Look at Animals by Diane James and Sara Lynn
Photos and drawing accompany simple introductions to different birds.

Book: Usborne Mysteries & Marvels of Insect Life by Jennifer Owen
Colorful and detailed illustrations with facts about many insects.

Lesson 2

"Tree Factory" pages 223-227
Project Learning Tree Environmental Education Pre K-8 Activity Guide

Objectives: Students will describe the general structure of a tree and explain how different parts of a tree help the tree function.

Skills: Ordering and arranging, speaking clearly, making inferences

Book: Sky Tree by Thomas Locker
A tree on a hill is painted as the sky changes through sun, wind, snow, ice, and seasons.

Book: Be a Friend to a Tree by Patricia Lauber
Simple but informative book about trees.

Book: The Life Cycle of a Tree by Bobbie Kalman
Text and photographs provide basic information about trees and their functions.

Lesson 3

"What Are Natural Resources?" Pages 5-11
Closing the Loop

Objectives: Students will learn about natural resources and the products people make from them.

Skills: Making predictions, cause and effect, levels of specific categories

Book: Conservation by Christine Peterson
Describes some of earth's natural resources, their importance, and how they can be safeguarded

Books: Oil, Wood, Soil, by Christin Ditchfield
These are easy to read informative books focusing on each natural resource, where it comes from, and how we use it.

Book: Brother Eagle, Sister Sky by Susan Jefferies
Susan Jefferies illustrated the speech Chief Seattle gave calling on the government to take care of the environment.

Book: The Lorax by Dr.Seuss
Dr. Seuss' story of the destruction of natural resources.

Lesson 4

"Nature's Music" pages 12-13
Discovering the Naturalist Intelligence

Objectives: Students will prepare a musical composition from sounds provided by nature and items collected from the school grounds.

Skills: Visualizing, patterns

Book: I'm in Charge of Celebrations by Byrd Baylor
The story of a girl who shares her love for the desert and creates her own days to celebrate.

Book: How Music Cam to the World retold by Hal Ober
Retells a Mexican legend in which the sky god and the wind god bring music from Sun's house to the Earth.

Lesson 5

"Animal Charades" pages 280-281
Project WILD

Objectives: Students will define wildlife and distinguish between domesticated and wild animals.

Skills: Interacting, making eye contact, making inferences

Book: The Usborne World of Animals by Susanna Davidson and Mike Unwin
Great pictures and facts about a wide variety of animals.

Lesson 6

"Touching Ten" pages 8-10
Discovering the Naturalist Intelligence

Objectives: Students will experience ways to observe using touch and adjectives.

Skills: Observing, adjectives

Book: Earth and You a Closer View by J. Patrick Lewis
This book looks at features of the earth and connects them to us.

Lesson 7

"Wonders of Clouds" Pages 24-26
Discovering the Naturalist Intelligence

Objectives: Students will identify various types of clouds while learning what clouds are made of.

Skills: Observation, cause and effect

Book: Cloud Dance by Thomas Locker
Beautifully illustrated book follows clouds through different times of the day and seasons.

Book: Cloudy with a Chance of Meatballs by Judi Barrett
A story of various types of weather and how they are related to foods we eat.

Book: The Cloud Book by Tomie de Paola
Simple introduction to the different type of clouds.

Unit 3
Look Again

Lesson 1

"School Yard Safari" pages 151-152
Project Learning Tree Environmental Education Pre K-8 Activity Guide

Objectives: Students will find signs of animals living in the school year and describe ways the school environment provides those animals with what they need to live.

Skills: Observing, concluding, interpreting

Book: Earth and Me Our Family Tree by Patrick Lewis
This book explores animals and their habitats, conjuring a respect for nature's creatures.

Book: Hawk, I'm Your Brother by Byrd Baylor
A boy captures a hawk in the hope that he can also capture some sense of its ability to fly.

Lesson 2

"Learning to Look, Learning to See" pages 278-279
Project WILD

Objectives: Students will describe differences seen in the environment as the result of casual and detailed observation, and give reasons for the importance of looking closely at any environment.

Skills: Observing, drawing conclusions

Book: The Table Where the Rich People Sit by Byrd Baylor
As a family attempts to calculate the value of the desert hills, the color of blooming cactus, and the calls of eagles and great horned owls, they realize they are rich beyond measure.

Lesson 3

"Wildlife is Everywhere" pages 51-52
Project WILD

Objectives: Students will compare human and wildlife habitat, and generalize that wildlife is present around the world.

Skills: Observing, predicting, making connections

Book: Earthsong by Sally Rogers
This book shows many different animals in their natural habitats around the world. It also includes a song students can learn.

Lesson 4

"A Vision in Nature" pages 119-121
Discovering the Naturalist Intelligence

Objectives: Students will learn that various plants and animals live in various places called habitats.

Skills: Visualizing, making Connections

Book: Desert Voices by Byrd Baylor and Peter Parnall
This book has poetic descriptions of desert animals in their habitats.

Book: Welcome to the Sea of Sand by Laura Regan
Beautifully illustrated book about plants and animals in the desert habitat.

Book: Destination: Rain Forest by Jonathan Grupper
Plants and animals of the rain forest habitat.

Book: America's Prairies and Grasslands Guide to Plants and Animals by Marianne D. Wallace
Detailed guide to the animals and plants in prairies and grasslands.

Book: America's Seashores Guide to Plants and Animals by Marianne D. Wallace
Detailed guide t the animals and plants in the seashore.

Book: America's Wetlands Guide to Plants and Animals by Marianne D. Wallace
Detailed guides to the plants and animals of wetlands.

Lesson 5

"Thorns and Threats" pages 51-57
Hands-On Nature

Objectives: Students will observe different ways plants make themselves inedible or distasteful and identify different defense strategies used by animals and plants.

Skills: Observing, making connections, inferring, using adjectives

Book: Plantzilla by Jerdine Nolen, Brian Keliher, and David Catrow
Mortimor takes the class plant home for the summer and it begins to develop strange human characterizes.

Book: What are Camouflage and Mimicry? The Science of Living Things by Bobbie Kalman
This book describes camouflage and mimicry in easy to understand terms and colorful pictures.

Lesson 6

"Camouflage" pages 230-231
Hands-On Nature

Objectives: Students will see how matching color can be an effective camouflage, and construct creatures that will be will camouflaged for a specific habitat.

Skills: Making connections, drawing conclusions

Book: What are Camouflage and Mimicry? The Science of Living Things by Bobbie Kalman
This book describes camouflage and mimicry in easy to understand terms and colorful pictures.

Book: What Color is Camouflage? by Carolyn B. Otto
The book explains how animals' coloring can protect them.

Unit 4
Fossils

Lesson 1

"A Picture is Worth a Thousand Words" Pages 114-115
Discovering the Naturalist Intelligence

Objectives: Students will orally communicate accurate descriptions of an object to a partner who draws the object.

Skills: Observing, adjectives, figurative language

Book: Frederick by Leo Lionni
A field mouse collects images of summer to sustain himself and his friends through the winter.

Lesson 2

"My Unique Rock" pages 27-28
Discovering the Naturalist Intelligence

Objectives: Students will become familiar with various types of rocks in the school yard and observe and identify special features of rocks.

Skills: Observing, visualizing, large group discussion

Book: Everybody Needs a Rock by Byrd Baylor
A girl presents her 10 rules for finding your own special rock.

Lesson 3

"Sounds Around" pages 9-12
Project Learning Tree Environmental Education Pre K-8 Activity Guide

Objectives: Students will identify sounds and map their locations in the environment, and explain how noise can be a problem in the community.

Skills: Classifying and categorizing, organizing information, identifying relationships and patterns, and problem solving

Book: The Other Way to Listen by Byrd Baylor and Peter Parnall
This is a story of a man who has a special way of listening to nature and his attempt to teach a boy how to listen also.

Lesson 4

"Classroom Carrying Capacity" pages 9-11
Project WILD

Objectives: Students will define carrying capacity, give examples of factors that can influence the carrying capacity of an area, and describe how exceeding the carrying capacity can affect the behavior of animals and humans.

Skills: Drawing conclusions, making inferences

Books: Who Eats What? Food Chains and Food Webs by Patricia Lauber
This book explains how every link in a food chain is important because each living thing depends on each other for survival.

Lesson 5

"Riddle Me" pages 116-118
Discovering the Naturalist Intelligence

Objectives: Students will use their senses in careful observation and use synonyms to enliven and clarify descriptions.

Skills: Observing, using synonyms, using a thesaurus

Book: If You Are a Hunter of Fossils by Byrd Baylor and Peter Parnell
A fossil hunter looking for signs of an ancient sea in the rocks of a western Texas mountain describes how the area must have looked millions of years ago.

Lesson 6

"Habitats" pages 65-70
Hands-On Nature

Objectives: Students will become familiar with animals that live in or visit a field.

Skills: Drawing conclusions, making inferences

Book: Why Should I Protect Nature? by Jen Green
With amusing pictures and simple text this book shows the importance of protecting nature.

Book: In My Own Backyard by Judi Kurjian
A boy imagines what his backyard would have looked like in the past.

Book: America's Prairies and Grasslands Guide to Plants and Animals by Marianne D. Wallace
Detailed guide to the animals and plants in prairies and grasslands.

Unit 5
Courage

Lesson 1

"Playing Lightly on the Earth" pages 432-433
Project WILD

Objectives: Students will distinguish between games that are damaging and not damaging to the environment, and invent game with a benign effect on the environment.

Skills: Making connections, making predictions

Book: Fireflies by Julie Brinckloe
This is a story oif a boy who catches fireflies and keeps them in a jar until their light begins to fade.

Lesson 2

"To Be a Tree" pages 219-222
Project Learning Tree

Objectives: Students will create a tree costume and review the structure and function of tree parts.

Skills: Ordering and arranging, summarizing

Book: Trees and Forests by Gallinard Jeunesse
This well-illustrated book is filled with facts about forests and the plants and animals that live in habitat.

Book: My Favorite Tree Terrific Trees of North America by Diane Iverson
This book examines the traits and uses of 26 North American trees.

Lesson 3

"Acting Out the Water Cycle" pages 37-38
Discovering the Naturalistic Intelligence

Objectives: Students "become" various parts of the after cycle and understand their relationship to one another.

Skills: Cause and effect, making connections

Book: A Drop Around the World by Barbara McKinney
This book follows a raindrop as it touches plants, animals, and humans around the world.

Book: Water Dance by Thomas Locker
Beautifully illustrated depiction of the water cycle

Lesson 4

"Trees in Trouble" pages 293-298
Project Learning Tree Environmental Education Pre K-8 Activity Guide

Objectives: Students will cite factors that can cause trees to become unhealthy, describe symptoms of an unhealthy tree, and compare environmental conditions that affect both human health and plant health.

Skills: Analyzing, comparing and contrasting, problem solving

Book: Bigfoot Cinderrrrrella by Tony Johnston and James Warhola
A version of Cinderella that emphasizes protecting the old growth forest and endangered animals.

Book: The Great Kapok Tree A Tale of the Amazon Rain Forest by Lynne Cherry
The story of a community of animals that try to protect their tree in the rain forest.

Lesson 5

"Dirt Works" pages 39-41
Discovering the Naturalist Intelligence

Objectives: Students will learn about the characteristics of dirt, where it comes from, and how it works for the environment.

Skills: Making inferences, sequencing

Book: Soil by Christin Ditchfield
In clear, easy-to-read language this book describes how soil is formed, what it's made of, and what it's used for.

Lesson 6

"Tree Lifecycles" pages 302-305
Project Learning Tree

Objectives: Students will diagram the lifecycle of a tree, compare a tree lifecycle to a human lifecycle, and explain the role each lifecycle plays in the forest ecosystem.

Skills: Ordering and arranging, identifying relationships and patterns

Book: Tell Me Tree: All About Trees for Kids by Gail Gibbons
This book has detailed illustrations providing basic information about trees and their functions.

Resources

American Forest Foundation. (2002). Project learning tree environmental education pre k-8 activity guide. Washington DC: Author.

California Environmental Protection Agency Integrated Waste Management Board. (2000). Closing the loop: Exploring integrated waste management and resource conservation. Sacramento, CA: Enterprise Printing.

Council for Environmental Education. (2002). Project WILD k-12 curriculum & activity guide. Houston, TX: Author.

Glock, J., Weetz, S., & Meyer, M. (1999). Discovering the naturalist intelligence. Chicago, IL: Zephyr Press.

Lingelbach, J., & Purcell L, (Eds.). (2000). Hands-on nature information and activities for exploring the environment with children. Woodstock, VT: Vermont Institute of Natural Science.

The Watercourse, Montana State University. (2002). Project WET: Water education for teachers. Bozeman, MT: Author.

APPENDIX B

MATH

Math

The Scott Foresman California Mathematics program is divided into 12 concept chapters. The second grade teachers have the discretion to go at their own pace and present the chapters in any order. In this section is a list of outdoor activities coordinated with each chapter. At the beginning of each chapter the teachers can review the activities and incorporate them into their lesson plans.

Some concepts are difficult to take outdoors, for example using money and adding and subtracting three-digit numbers. For these chapters lessons that have to do with graphing and problem solving are included. Also included are some activities created specifically to combine math and outdoors. A detailed outline of these newly created activities is included in the corresponding chapters.

Chapter 1
Using Addition and Subtraction Strategies

"Sensory Explorations" pages 7-9
Discovering the Naturalist Intelligence

Objectives: Students will employ their senses while observing and becoming aware that there are many ways in addition to using your eyes to observe. The students will tally their observations and make a graph of the class' findings.

Math Skills: Addition, tallying data, graphing

"Our School Yard Community" pages 44-46
Discovering the Naturalist Intelligence

Objectives: Students will observe and identify plants and animals in the school yard and classify them into the groups: producers and consumers. Students will add up all the plant producers and animal consumers they discovered, and then create a bar graph.

Math Skills: Addition, graphing

Chapter 2
Place Value and Adding Two-Digit Numbers

"School Yard Bingo" pages 11-15"
Discovering the Naturalist Intelligence

Objectives: Students will closely observe common items found in the school yard by playing a bingo game. Then they will create addition word problems using the information on the bingo cards.

Math Skills: Tallying, addition word problems

Book: Earth Day – Hooray! by Stuart J. Murphy
Kids collect cans to recycle to beautify their local park. They count up their cans in groups of tens.

"Measuring Up" pages 57-58
Trees are Terrific!

Objectives: Students will find the largest tree in n area by measuring and adding the tree's circumference, height, and crown spread.

Skills: Measurement, addition

Chapter 3
Subtracting Two-Digit Numbers

"Nature Word Problems"

Objectives: Students will create their own two-digit subtraction word problems using objects they find outdoors.

Skills: Problem solving, subtraction

"The Colors of Nature"

Objectives: Students will observe different objects in nature and record their colors. Students will tally and graph the results.

Skills: Tallying, graphing

Nature Word Problems

Objectives: Students will create their own two-digit subtraction word problems using objects they find outdoors.

Skills: Problem solving, subtraction

Procedure: Before taking the students outdoors, model creating a subtraction word problem together. Go over subtraction vocabulary, for example how many more, take away, and have left.

Take the students outside to either the park or playground. First, they need to count objects which will total more than 10. Then they will create a subtraction word problem using their objects.

Gather together, or go back to class, and have a student read his/hers problem so the others can solve it.

The Color of Nature

Objectives: Students will observe different objects in nature and record their colors. Students will tally and graph the results.

Skills: Tallying, graphing

Procedure: Before going outside brainstorm what colors the students might see outside. Model what a tally sheet can look like and have students create their own.

Go outside to either the park or the playground and have students record the different colors they observe. When they get back to class they can make individual graphs or the class can work together to make a class graph.

Chapter 4
Money

"Litter on the School Grounds" pages 161-174
Closing the Loop

Objectives: Students will explore the question "What is litter?" and identify areas on the school grounds or nearby areas where litter is a problem and offer ways to solve the problem. Students will complete tally sheets and graph their results.

Math Skills: Addition, tallying data, graphing, using charts

Extension: Students will find the value of some of the items by adding up the coins stamped on the tally sheets.

Chapter 5
Time

"Sun Power" pages 297-299
Hands-On Nature

Objectives: Students will create a sun dial on the playground by marking a yardstick's shadow every hour.

Math Skills: Elapsed Time

"Walk the Talk" pages 17-18
Waste in_Place

Objectives: Students will identify the seven sources of litter. They will observe litter on the playground at various times and graph their result.

Skills: Graphing

Chapter 6
Patterns and Numbers to 1,000

"Counting Sounds" page 28
Teaching Basic Skills Through Environmental Education Activities

Objectives: Students will reinforce counting, addition and subtraction skills and increase awareness of sounds in the environment.

Skills: Addition, subtraction, number patterns

"Eagles and Salmon" pages 66-68
Discovering the Naturalist Intelligence

Objectives: Students will understand the concept of predator and prey and the effect of a diminished food supply on living things within a habitat.

Math Skill: Tallying, making a table

Books: Who Eats What? Food Chains and Food Webs by Patricia Lauber
This book explains how every link in a food chain is important because each living thing depends on each other for survival.

Chapter 7
Adding and Subtracting Three-Digit Numbers

"Dead or Alive?" pages 101-103
Discovering the Naturalist Intelligence

Objectives: Students will observe and classify objects in the school yard as living or nonliving by applying criteria. Students will make a graph of their findings.

Skills: Graphing

"Bull's-eye"

Objectives: Students will add three-digit numbers they create by throwing a beanbag on a bull's-eye drawn on the playground.

Skill: Adding three-digit numbers, place value

Bull's-eye

Objectives: Students will add three-digit numbers they create by throwing a beanbag on a bull's-eye drawn on the playground.

Skill: Adding three-digit numbers, place value

Procedure: Before going outside model drawing a bull's-eye on the board. It needs to have three rings. Put three single digit numbers inside each ring. Demonstrate how to make a three digit number by choosing one number from each ring, first for the hundred's place, then the ten's place, and finally the one's place. Explain that the students will be throwing beanbags at the bull's-eye to choose their numbers. Outside the students will work with a partner. They will first draw a bull's-eye on the playground using chalk. They can pick what numbers they want and where to put them. Next, they can throw the beanbags and making their numbers. When they have two three-digit numbers they will subtract them. When each partner has three problems completed, they will bring them to the teacher for assessment.

Chapter 8
Measurement

"Magic of the Sun" pages 61-63
Discovering the Naturalist Intelligence

Objectives: Students will observe ways the sun transfers energy in the form of heat to the earth.
They will use a thermometer to measure

Math Skills: Reading a thermometer, temperature

"Air Plants" pages 85-87
Project Learning Tree Environmental Education Pre K-8 Activity Guide

Objectives: Students will demonstrate and describe the general process of photosynthesis, and explore the relationship of the amount of oxygen produced by plants and the amount of oxygen used by humans.

Math Skills: Measurement, perimeter

"Frogs and Polliwogs" pages 58-62
Hands-On Nature

Objectives: Students will compare a frog's ability to jump with their own. They will measure how far they can jump using yard and meter sticks.

Math Skills: Measurement-inches, feet, and yards

Book: Why Frogs Are Wet by Judy Hawes
This book has easy to understand facts and illustrations of frogs.

"The Long Haul" pages 260-261
Project WET

Objectives: Students will develop an awareness of various volumes of water, appreciate today's readily available water supplies, and relate how easy access to water can encourage people to use large amounts of water.

Math Skill: Measurement, gallons

Chapter 9
Geometry

"School Grounds Scavenger Hunt" pages 2-4
Discovering the Naturalist Intelligence

Objectives: Students will distinguish among objects based on their physical properties, especially shape and color.

Math Skills: Solid Shapes, plane Shapes

"The Shape of Things" pages 3-4
Project Learning Tree Environmental Education Pre K-8 Activity Guide

Objectives: Students will identify common shapes appearing in the natural and built environment as a way of understanding the function of shapes.

Math Skills: Solid Shapes, plane Shapes

"The Closer You Look" pages 217-218
Project Learning Tree Environmental Education Pre K-8 Activity Guide

Objectives: Students will describe the overall structure of a tree and describe the structure and function of the tree's principle parts.

Math Skills: Solid shapes, plane shapes

"Air Plants" pages 85-87
Project Learning Tree Environmental Education Pre K-8 Activity Guide

Objectives: Students will demonstrate and describe the general process of photosynthesis, and explore the relationship of the amount of oxygen produced by plants and the amount of oxygen used by humans.

Math Skills: Measurement, perimeter

Chapter 10
Fractions and Probability

"No Bellyachers" pages 85-88
Project WET

Objectives: Students will recognize factors that contribute to avoiding a cold, describe how some infectious diseases are spread by water or water droplets, and identify ways to reduce the chances of becoming infected with a disease.

Math Skills: Probability

Book: Germs Make Me Sick! By Melvin Berger
Explains how bacteria and viruses effect the human body and how the body fights them.

"Playground Litter" page 32
Teaching Basic Skills Through Environmental Education Activities

Objectives: Students will show the various types of litter found on the playground in fraction form.

Skills: Fractions of a group

"Looking at Leaves" pages 228-231
Project Learning Tree Environmental Education Pre K-8 Activity Guide

Objectives: Students will determine what fraction of the trees at the park are pines, ash, and eucalyptus by examining and classifying their leaves.

Skills: Fractions of a group

Book: Tell Me, Tree All About Trees for Kids by Gail Gibbons
This book has detailed illustrations providing basic information about trees and their functions.

Book: My Favorite Tree Terrific Trees of North America by Diane Iverson
This book examines the traits and uses of 26 North American trees.

Chapter 11
Multiplication

"Multiplication Egg Hunt"

Objectives: Students will reinforce multiplication facts by searching for corresponding egg halves.

Skill: Memorizing multiplication facts

"Dandelions" pages 176-180
Hands-On Nature

Objectives: Students will count the seeds on a dandelions head and record the number of seeds it contains. Using multiplication they will determine how many descendants will be possible in four generations.

Skills: Tallying and recording data, multiplication

Book: Dandelions Stars in the Grass by Mia Pasada
Rhyming text presents information about the dandelion, a recipe, and science activities.

"Flowers" page 27
Teaching Basic Skills Through Environmental Education Activities

Objectives: Students will collect observe flowers and count their petals. Using multiplication they will determine the number of petals on multiple flowers.

Skills: Observing, tallying and recording, multiplication

Book: The Reason for a Flower by Ruth Heller
Beautiful illustrations and easy to understand basic information about flowers.

Multiplication Egg Hunt

Objectives: Students will reinforce multiplication facts by searching for corresponding egg halves.

Skill: Memorizing multiplication facts

Procedure: Use the plastic Easter eggs. On one half of the egg, write a multiplication fact, for example 3 x 3. On the other half write the answer. Take the answer halves outside and "hide" them. Give each student one of the other halves. The students will find the other half of their egg that has the correct answer.

Chapter 12
Division

"Remainder of One"

Objectives: Students will divide themselves into rows of equal numbers and determine if there will be any remainders.

Skills: Division with remainders

Book: Remainder of One by Elinor J. Pinczes
A squadron of bugs keeps trying to divide themselves into even rows so there will be no remainders.

"Seed Dispersal" pages 135-140
Hands-On Nature

Objectives: Students will discover what seeds can be found outside and how there are dispersed. After collecting seeds they will use them to solve division problems.

Skills: Inferring, division

Book: The Carrot Seed by Ruth Krauss
A boy plants a carrot seed and waits for it to grow.

Book: All About Seeds by Melvin Berger
Information and activities about seeds.

Resources

American Forest Foundation. (2002). Project learning tree environmental education pre k-8 activity guide. Washington DC: Author.

Bowman, M. L. (1979). Teaching Basic Skills Through Environmental Education Activities. Columbus, OH: The Ohio State University.

California Environmental Protection Agency Integrated Waste Management Board. (2000). Closing the loop: Exploring integrated waste management and resource conservation. Sacramento, CA: Enterprise Printing.

Council for Environmental Education. (2002). Project WILD k-12 curriculum & activity guide. Houston, TX: Author.

Glock, J., Weetz, S., & Meyer, M. (1999). Discovering the naturalist intelligence. Chicago, IL: Zephyr Press.

Lingelbach, J., & Purcell L, (Eds.). (2000). Hands-on nature information and activities for exploring the environment with children. Woodstock, VT: Vermont Institute of Natural Science.

The Watercourse, Montana State University. (2002). Project WET: Water education for teachers. Bozeman, MT: Author.

APPENDIX C

RECYCLE PROGRAM

Recycling Program

It is our job as educators to prepare our students for the future. We provide them with the knowledge, skills, and motivation to tackle whatever lies ahead. They will need a basic knowledge of not only reading and math, but also how things work and the environment that surrounds them. We need to teach them how to analyze a problem and find solutions. It is also essential students learn to work in cooperation with others and develop good communication skills.

One way to accomplish these goals is to use the environment as a foundation in education. Not only will students gain knowledge and skills, research has found programs that integrate environmental education throughout the curriculum produces: better performance on standardize tests in all areas, reduced discipline and classroom management problems, increased attendance and enthusiasm for learning, and students have greater pride in accomplishments.

The goal of environmental education is to produce citizens who have knowledge of the biophysical environment and its associated problems, have the problem solving skills needed to address these problems, and are motivated to take them on. The environment is linked to almost all professions and is affected by almost everything we do. This recycling program will be an introduction to environmental education.

The program begins with a presentation of the Super Recycler and will include activities, videos, children's books, assemblies, and recycling. The students will also get the chance to become Super Recyclers and have their picture put up on the Super Recycler bulletin board.

Goals & Objectives

Teachers and Students will:
1. Gain an understanding of waste management.
2. Identify the problems and issues related to waste management.
3. Gain sensitivity to the fact that:
   the problems and issues affect them directly and they can make a difference as individuals
4. Create solutions and put them into action.

Program Outline

The Super Recycler
Mrs. Kirchhoff will present a short Super Recycler introduction to each of the second grade classes. The costume consists of a cape, newspaper hat, and Kool-Aid purse. Attached is a copy of the presentation which focuses on the importance of recycling and reusing paper. Each day the student who brings in the most recycling materials will get to wear a child's size super recycler cape. The students will also have their picture taken to put up on a super recycling bulletin board in the second grade hallway.

Recycle
The students and teachers will bring in aluminum cans and plastic items to recycle. Recycle bins will be provided by the City of Ontario. Also, each class will have a paper recycle box that will be collected once a week.

Activities
Copies of grade appropriate outdoor activities will be made available for the teachers. A list of these activities is provided in this project.

Children's Books
A variety of children's books related to recycling and the environment will be available for the teachers to use. A list of the books is provided.

Videos
Recycle Rex, CA Department of Conservation
Cartoon dinosaur Recycle Rex and his friends learn how to recycle, reduce, and reuse.

Kids Talkin' Trash, California Integrated Waste Management Board
This video introduces recycling, reducing, reusing, and rot.

Assemblies
Recycling assemblies include:
Paul Cash Environmental Magic Show
City of Ontario Recycling with Radio Disney

Activities

Each activity provided will include one or more of the California State Standards. For example, "Garbage Pizza" from Waste in Place covers the second grade standards:

Math
Number Sense 4.1, 4.2, 4.3
Statistics, Data Analysis and Probability 1.1
Science
Investigation and Experimentation 4c
Language Arts
Written and Oral English Language Conventions 1.1, 1.2, 1.3,
Listening and Speaking 1.1, 1.2, 1.3, 1.4

"People Use Natural Resources" pages 13-24
Closing the Loop

Objectives: Students will be able to trace objects to the category of natural resources from which they were made. They will also identify some of the natural resources that people need in order to live.

Skills: Observing, Communicating, Comparing, Ordering, Classifying

"There is No "Away" pages 37-42
Closing the Loop

Objectives: Students will learn that most if the "garbage" in the classroom usually goes to a landfill, but many items considered garbage are actually materials that can be reduced, reused, and recycled to conserve natural resources.

Skills: Observing, Communicating, Comparing, Classifying, Relating

"Treasures of the Earth – A Play" pages 43-48
Closing the Loop

Objectives: The students will share with others the importance of caring for natural resources by presenting a play

Skills: Observing, Communicating, Relating, Applying

"Reducing the Amount of Plastic That Goes to a Landfill" pages 53-61
Closing the Loop

Objectives: The students will identify products made from plastic, learn how to distinguish different types of plastic by their plastic container code numbers, identify which types of plastics can be recycled in their community, and develop a plan to reduce the amount of plastic that goes to the landfill.

Skills: Observing, Comparing, Classifying, Applying

"What Do I Do With It Now?" pages 63-74
Closing the Loop

Objectives: The students will determine what beverage containers are made of and which containers can be reused or recycled.

Skills: Observing, Comparing. Communicating, Categorizing

"Sounds From Reused Materials and Songs About Reusing and Recycling" pages 93-100
Closing the Loop

Objectives: Through writing and singing songs, students reinforce what they have learned about reusing and recycling various items. They will also reuse items to make musical instruments.

Skills: Observing, Communicating, Comparing

"Litter Relay" pages 183-188
Closing the Loop

Objectives: The students will learn about the kinds of litter that can be reused or recycled.

Skills: Observing, Communicating, Comparing, Classifying

"Packaging Can Become Litter" pages 189-196
Closing the Loop

Objectives: The students will learn that similar products re packaged in a variety of ways and that some packaging might be considered excessive. They will also learn how to reduce the amount of packaging in their lunches.

Skills: Observing, Classifying, Comparing, Applying

Recycle Where You Live, Learn, and Play
Recycle Rex activity booklet
http://www.conserve.ca.gov/DOR/rre/index.htm

An activity booklet full of games, crafts, information, and worksheets.

"Garbage Pizza" pages 47-50
Waste in Place

Objectives: Students will be able to describe the composition if Municipal Solid Waste and identify items within each waste category.

Skills: Observing, Classifying, Comparing

"Good Habits" pages 7-9
Waste in Place

Objectives: Students will be able to recognize that many of their actions are habits and that littering is a habit that has a negative impact on the environment.

Skills: Observing, inferring

Recycling Books

Dinosaurs to the Rescue! A Guide to Protecting Out Planet
By Laurie Krasny Brown and Marc Brow
Dinosaur characters introduce earth's major environmental problems and suggest ways children can help.

Where Does the Garbage Go?
By Paul Showers
This book explains what happens to the garbage after you throw it away.

When Is It Great To Turn Green?
By Michele Drohan & Caroline M. Levchuck
Humorous questions with serious answers about many environmental questions.

The Great Trash Bash
By Loreen Leedy
The animals of Beaston find better ways to

Young Discovers Garbage and Recycling
By Rosie Harlow & Sally Morgan
This book if full of environmental facts, experiments, and activities.

A River Ran Wild
By Lynne Cherry
An environmental history of the Nashua River from its discovery by Indians through the polluting years of the Industrial Revelation to the ambitious cleanup that revitalized it.

Our Planet Earth
By Lisa Feder-Feitel
Informative book about earth's features and environments.

Earth Day Birthday
By Pattie Schnetzler
Picture book about animals and the earth written like the 12 days of Christmas.

Earth Day – Hooray!
By Stuart J. Murphy
Kids collect cans to recycle to beautify their local park.

The Magic School Bus Gets Recycled
By Anne Capeci
Ms. Frizzle and her magic school bus take a trip to the recycling center.

How Spider Stopped he Litterbugs
By Robert Kraus
Spider and his friends turn the litterbugs into jitterbugs.

Our Earth
By Anne Rockwell
Easy to read book about earth's history, features, and ecosystems.

Resources

American Forest Foundation. (2002). Project learning tree environmental education pre k-8 activity guide. Washington DC: Author.

California Environmental Protection Agency Integrated Waste Management Board. (2000). Closing the loop: Exploring integrated waste management and resource conservation. Sacramento, CA: Enterprise Printing.

Keep America Beautiful, Inc. (1997). Waste In Place. Stamford, Ct: Author.

The Watercourse, Montana State University. (2002). Project WET: Water education for teachers. Bozeman, MT: Author.

REFERENCES

Bennett, J., Calhoun, C., Cavanagh, M., Croon, L., Krulik,S., Laing, R., et al. (2001). California mathematics (Grade 2 tacher's ed.). Glenview, IL: Scott Foresman.

Bereiter, C., Brown, A., Campione, J., Carruthers, I., Case, R., Hirshberg, J., et al. (2002). Open Court Reading (Level 2 Teacher's ed.). Columbus, OH: SRA/McGraw-Hill.

Chawla, L. (1999). Life paths into effective environmental action. The Journal of Environmental Education, 31(1), 15-26.

Christenson, M. A. (2004). Teaching multiple perspectives on environmental issues in elementary classrooms: A story of teacher inquiry. The Journal of Environmental Education, 35(4), 3-16.

Engleson, D. C., & Yockers, D. H. (1994). A guide to curriculum planning in environmental education. Madison, WI: Wisconsin Department of Public Education.

Hungerford H. R., & Volk, T. L. (2001a). Changing learner behavior through environmental education. In H. R. Hungerford, W. J. Bluhm, T. L. Volk, & J. M. Ramsey (Eds.), Essential readings in environmental education (2nd ed., pp. 289-304). Champaign, IL: Stipes Publishing L.L.C.

Hungerford H. R., & Volk, T. L. (2001b). Curriculum development in environmental education for the primary school: Challenges and responsibilities. In H. R. Hungerford, W. J. Bluhm, T. L. Volk, & J. M. Ramsey (Eds.), Essential readings in environmental education (2nd ed., pp. 97-107). Champaign, IL: Stipes Publishing L.L.C.

Lieberman, G. A., & Hoody, L. L. (1998). Closing the achievement gap: Using the environment as an integrating context for learning. Poway, CA: Science Wizards.

Louv, R. (2005). Last child in the woods: Saving our children from nature-deficit disorder. Chapel Hill, NC: Algonquin Books of Chapel Hill.

Marcinkowski, T. (2001). Predictors of responsible environmental behavior: A review of three dissertation studies. In H. R. Hungerford, W. J. Bluhm, T. L. Volk, & J. M. Ramsey (Eds.), Essential readings in environmental education (2nd ed., pp. 247-276). Champaign, IL: Stipes Publishing L.L.C.

Marriott, S. (2002). Red in tooth and claw? Images of nature in modern picture books. Children's Literature in Education 33(3), 175-183.

O'Brien, K., & Stoner, D. K. (1987). Increasing environmental awareness through literature. The Reading Teacher, 41(1), 14-19.

Stapp, W. B., et al. (1969). The concept of environment education. The Journal of Environmental Education, 1(1), 30-31.

Sward, L. L., & Marcinkowski, T. (2001). Environmental sensitivity: A review of the research, 1980-1998. In H. R. Hungerford, W. J. Bluhm, T. L. Volk, & J. M. Ramsey (Eds.), Essential readings in environmental education (2nd ed., pp. 277-287). Champaign, IL: Stipes Publishing L.L.C.

Trousdale, A. M., & DeMoor, E. A. (2005). Literature that helps children connect with the earth. Encounter: Education for Meaning and Social Justice, 18(3), 44-49.

Wagner-Lawlor, J. A. (1996). Advocating environmentalism: The voice of nature in contemporary children's Literature. Children's Literature in Education, 27(3), 143-152.